Space Weather Forecast

Issued on Sunday, 11 August 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-class flares expected with a chance of isolated Strong flares. Occasional G1-G2/Minor to Moderate geomagnetic storms likely with the potential for Coronal Mass Ejection (CME) arrivals.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with persistent high Common class activity and the largest flare a Moderate flare originating from AR3780 near centre disk at 11/0528UTC. There are ten sunspot regions visible on the disc. AR3780 remains very large, displaying a complex magnetic structure. All other regions appear generally stable.

Analysis of a coronal mass ejection (CME) produced in association with the Moderate flare at 10/0237UTC suggest an Earth directed component with an arrival time at Earth for early Day 4 (13 Aug). No other significant CMEs observed in available imagery.

Solar Wind / Geomagnetic Activity: Slightly elevated solar wind conditions observed through the period. A CME arrival was observed at approximately 10/1205UTC. The Interplanetary Magnetic Field, Bt, was generally weak to start, increasing to become moderate following CME arrival. The north-south component varied weakly. Geomagnetic activity was Quiet (Kp1-2) before increasing to minor geomagnetic storm, Kp5, between 11/0600-0900UTC then Active, Kp4, between 11/0900-1200UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast, with occasional Moderate-class flares expected and a slight chance of isolated Strong-class flares.

Solar Wind /Geomagnetic Activity: Continued impacts from one or more CMEs that left the Sun on the 7th are likely to begin the period. A further CME associated with a strong flare on the 8th has the potential to arrive at Earth later Day 1 (11 Aug) though there is larger than usual uncertainty due to the challenging analysis and the exact arrival time is low confidence. Another CME in association with a moderate flare on the 9th produced a CME also forecast to have an Earth-directed component, with analysis suggesting an arrival early on Day 3 (13 Aug). This arrival may be coincident with a further CME which was observed in association with another moderate flare from the 10th. The interaction of these two CMEs acting to lower confidence in arrival time significantly.

CME influence is likely at times throughout the forecast period, however overall confidence in the CME forecast is low. Geomagnetic activity is expected to be mostly Quiet to Unsettled (Kp2-3), but with occasional G1-G2/Minor to Moderate Storming (Kp5-6) intervals likely in association with CME arrivals, and just a slight chance of G3/Strong (Kp7) storms. This risk decreases slightly going into Day 4 (14 Aug), but further CME influence remains possible.

Energetic Particles / Solar Radiation: A heightened risk of flare activity brings the slight chance of reaching or exceeding Minor Radiation Storm levels should any significant flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	70	70	40
Strong	G3	No	15	10	10	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	90	90	85	80
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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